A Six-Legged Hybrid Walking and Wheeled Vehicle

Abstract

Curtin University of Technology, Perth, Western Australia

Lecturer in Mechanical Engineering, School of Mechanical Engineering

Samuel N. Cueto

A six-legged hybrid walking and wheeled vehicle is a novel concept that combines the advantages of both walking and wheeled vehicles. This design offers increased mobility and stability over traditional wheeled and walking vehicles. The vehicle is composed of six legs with a hydraulic system that allows for smooth transitions between walking and wheeled modes. The design includes features such as variable-length legs, which can adjust to various terrains, and a central control system that regulates the movement of the vehicle. This paper discusses the mechanics and control specifications of a hybrid vehicle, addressing the mechanical design and control of the six-legged hybrid walking and wheeled vehicle.
Figure 1. Simulation of the Hydrobug using Visual C++ and Microsoft DirectX.

The Hydrobug is a hybrid underwater vehicle designed to operate in both surface and underwater environments. It is equipped with a set of thrusters for propulsion and a propeller for maneuvrability. The vehicle's design allows it to travel at speeds of up to 5 km/h in walking mode, and up to 20 km/h in wheeled mode.

Figure 2. Mechanical design of the Hydrobug. Each leg has three degrees of freedom: rotation along the horizontal axis, and pitch and roll along the vertical axis. The vehicle's legs are designed to be able to climb over rough terrain and large obstacles, making it suitable for a variety of environments.
The diagram illustrates the layout of the hydraulic system. The hydraulic lines are shown in red, while the control system is depicted in blue. The system includes a main pump, hydraulic reservoir, and various control valves. The layout is designed to ensure smooth operation and efficient fluid flow.
Figure 6. Components of the air-damped wheel and leg suspension system.

Figure 7. Hyphen "leg", wheel, design showing fork, motor and suspension.
Process flows will be applied following to various aspects of this project. Progress reports will be submitted to the Principal Office, and weekly status reports will be submitted to the Principal Office, and monthly progress reports will be submitted to the Principal Office.

The hydraulic circuit diagram shown in Figure 1 illustrates the hydraulic system of the proposed prototype. The hydraulic circuit is designed to provide the necessary pressure and flow to operate the various components of the system. The hydraulic circuit includes a pump, a reservoir, a filter, a pressure regulator, and a variety of control valves and connections.

Figure 1: Hydraulic Circuit Diagram

[Diagram of hydraulic circuit with labels for pump, reservoir, filter, pressure regulator, and various control valves and connections]

3. Hydraulic Circuit Design

The hydraulic circuit is designed to ensure proper fluid flow and pressure control. The circuit includes a pump to generate the necessary flow, a reservoir to store excess fluid, a filter to remove impurities, and a pressure regulator to maintain the desired pressure level.

4. LEK Technologies and Control

LEK Technologies will provide the necessary control systems for the hydraulic circuit. The control systems will include sensors, controllers, and actuators to monitor and adjust the hydraulic system parameters as required.

5. Future Research

Future research will focus on improving the efficiency and performance of the hydraulic system. This will include developing new control algorithms and optimizing the design of the hydraulic components.

6. Conclusion

In conclusion, the proposed prototype is designed to meet the requirements of the project. The hydraulic circuit is carefully planned to ensure proper fluid flow and pressure control. Future research will focus on improving the system's efficiency and performance.
more often. Realistic applications with the proposed value will be considered

Table 1. Summary of Findings

<table>
<thead>
<tr>
<th>Findings</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved performance</td>
<td></td>
</tr>
<tr>
<td>Increased efficiency</td>
<td></td>
</tr>
<tr>
<td>Reduced costs</td>
<td></td>
</tr>
<tr>
<td>Enhanced user satisfaction</td>
<td></td>
</tr>
</tbody>
</table>

The design and rapid development of solutions is central to the development of

References


